

What Is Claimed Is:

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1. A gas phase distributor in a fluid bed reactor or furnace comprising a gas phase piping array discharging into a fluid bed of granular solids through a plurality of tuyeres which are coupled to and mounted beneath the piping array such that the granular solids are fluidized at a vertical elevation below the piping array thereby causing elevated temperature fluidizing gas to indirectly heat the fluidized bed through the piping array prior to entering the fluidized bed through the tuyeres.
2. The gas phase distributor of claim 1, where the discharge from the piping array is through openings or ports in a bottom portion of the piping array.
3. The gas phase distributor of claim 2 comprising a heat exchanger in a feed line to the gas phase distributor such that the heat exchanger location is above a vertical elevation of fluidizing gas distribution ports and submerged in the fluidized solids, thereby permitting indirect heat transfer from elevated temperature fluidizing gas so as to transfer energy to fluidized solids prior to entering the fluidized bed through the gas distributor ports.
4. The gas phase distributor of claim 1, wherein gaseous fuel is combusted with air to achieve high temperature combustion gas products, which is fed through the piping array in the fluid bed furnace transferring energy through the piping array to the fluid bed furnace thereby lowering the temperature

of the gas discharging through the tuyeres into the fluidized bed.

5. The gas phase distributor of claim 3, wherein gaseous fuel is combusted with air to achieve high temperature combustion gas products, which is fed through the piping array in the fluid bed furnace transferring energy through the piping array to the fluid bed furnace thereby lowering the temperature of the gas discharging through the ports into the fluidized bed.

6. The gas phase distributor of claim 4, where the fuel is a liquid fuel.

7. The gas phase distributor of claim 5, where the fuel is a liquid fuel.

8. The gas phase distributor of claim 1, wherein
the discharge direction of the tuyeres initiates
fluidization of the granular particles at an
elevation below the distribution piping array to
ensure the piping array is submerged in fluidized
solids which provides for a high heat transfer
coefficient from the piping array to the fluidizing
solids, thereby reducing the temperature of the
fluidizing gas prior to the discharging through the
tuyeres.

9. The gas phase distributor of claim 2, wherein
the discharge direction of the openings initiates
fluidization of the granular particles at an
elevation below the distribution piping array to
ensure the piping array is submerged in fluidized
solids which provides for a high heat transfer
coefficient from the piping array to the fluidizing
solids, thereby reducing the temperature of the

10 fluidizing gas prior to discharging through the tuyeres.

10. The gas phase distributor of claim 9, wherein
tuyeres convey the fluidizing gas in a downward
direction which enhances removal of any materials
which enter the tuyeres during periods of shutdowns
or low fluidizing gas flow rates.

11. The gas phase distributor of claim 3, wherein
the ports convey the fluidizing gas in a downward
direction which enhances removal of any materials
which enter the ports during periods of shutdowns
or low fluidizing gas flow rates.

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